

EVALUATION OF ANALGESIC ACTIVITY OF VARIOUS EXTRACTS OF ROOTS OF *SYMPHYTUM OFFICINALE*

MANPREET KAUR¹, HARINDER KAUR² & BHUPINDER SINGH SEKHON³

¹Department of Pharmaceutical Sciences (Pharmacognosy), G.H.G Khalsa College of Pharmacy, Gurusar Sadhar,
Ludhiana, Punjab, India

²Department of Pharmaceutical Sciences (Pharmacology), Govt. Institute of Pharmaceutical Sciences,
Amritsar, Punjab, India

³Department of Pharmaceutical Sciences (Pharmaceutical Chemistry), PCTE Institute of Pharmacy,
Near Baddowal Cantt, Ludhiana, Punjab, India

ABSTRACT

Symphytum officinale is a perennial flowering plant of the genus *Symphytum* in the family Boraginaceae. It is native to Europe and it is known elsewhere, including North America, as an introduced species and sometimes a weed. The leaves of the *Symphytum* have been used for the treatment of rheumatism and gout. The effect of petroleum ether, chloroform and ethanol extracts (400mg/kg body weight) of roots of *Symphytum officinale* were examined in swiss albino mice to evaluate analgesic activity. Acetic acid induced writhing model and tail immersion methods were employed to test analgesic activity. Diclofenac sodium was used as a standard drug (5mg/kg). The results of the study specify that the ethanol extract produced significant analgesic activity when compared with standard drug diclofenac sodium.

KEYWORDS: Analgesic Activity, Acetic Acid Induced Writhing Test, Diclofenac Sodium, Tail Immersion Method, *Symphytum officinale*

INTRODUCTION

Symphytum officinale is a perennial flowering plant of the genus *Symphytum* in the family Boraginaceae. Along with several species of *Symphytum*, it is commonly known as Comfrey. To differentiate it from other comfrees, this species may be known as common comfrey, ¹ Quacker comfrey, ¹ and cultivated comfrey. ¹ It is native to Europe and it is known elsewhere, including North America, as an introduced species and sometimes a weed. Comfrey has been used in folk medicine as a poultice for treating burns and wounds. The roots of the comfrey is used in case of pulmonary complaints. The leaves of the comfrey have been used for the treatment of rheumatism and gout.² In present study an attempt was made to investigate various extracts of roots *Symphytum officinale* for its analgesic effects as no work has been done for analgesic activity.

MATERIALS AND METHODS

Collection and Extraction

The roots of *Symphytum officinale* were purchased from Ghaziabad in April 2013 and were authenticated by the Dr Sunita garg (chief scientist) NISCAIR – CSIR New Delhi. A voucher specimen no (SO-1) is deposited in the departmental herbarium of G.H.G. Khalsa College of Pharmacy, Gurusar Sadhar, Ludhiana. The roots were dried in shade,

finely powdered and extracted successively with petroleum ether, chloroform, and ethanol using soxhlet apparatus. The extracts were concentrated to dryness under reduced pressure. All the extracts were preserved in a dessicator for further studies.

Animals

Swiss albino mice weighing between (20-25g) of either sex were used for the pharmacological studies. They were maintained on standard rodent diet and water *ad libitum*. The experimental protocols were approved by the institutional Animal Ethical Committee.

ANALGESIC ACTIVITY

Acetic Acid Induced Writhing Test

The acetic acid writhing model of koster³ was adopted in swiss albino mice (20-25g). They were divided into five groups. First group served as control group and received normal saline, second group served as positive control and received diclofenac sodium (5mg/kg). While third, fourth and fifth groups received petroleum ether, chloroform and ethanol extracts of roots of *Symphytum officinale* at a dose of 400mg/kg body weight. After 30 minutes first, third, fourth and fifth group were injected intraperitoneally with 0.6 % v/v with acetic acid solution (0.1ml/10g) whereas group second received the same after 15 minutes. The writhing movements were observed and counted for 15 minutes after administration of acetic acid. The results of the experiment are tabulated in table 1.

Tail Immersion Method

In this test method the terminal 5cm of the tail of the mice was submerged in hot water which was maintained at $55^{\circ} \pm 0.5^{\circ} \text{C}$. The reaction time between submerging of the tail and its removal out of the hot water was measured. A cut-off latency of 10sec was adopted to avoid damaging the tail. Total thirty animals were used for the study. One to six were marked as control group and administered normal saline. Seven to twelve were marked as positive control group and received standard drug diclofenac sodium (5mg/kg). Thirteen to eighteen, nineteen to twenty four and twenty five to thirty were marked as test groups and administered orally petroleum ether, chloroform and ethanol extracts (400mg/kg) respectively. The results of the study are enumerated in table 2.

Statistical Analysis

The mean value $\pm$ SEM was calculated for each parameter. The results were analyzed statistically by ANOVA is followed by Dunnet's test. The minimum level of significant was fixed at $p < 0.01$.

Table 1: Analgesic Effect of Various Extracts of Roots of *Symphytum officinale* Using Acetic Acid Induced Writhing method

Treatment	Dose	Number of Wriths Observed	Percentage Inhibition
Negative control (normal saline)	5ml/kg	34.8 ± 1.69	-
Positive control (Diclofenac sodium)	5mg/kg	$10.7 \pm 0.98^{**}$	67.38
Petroleum ether ext	400mg/kg	$29.3 \pm 0.94^{*}$	15.81
Chloroform ext	400mg/kg	$24.0 \pm 0.92^{*}$	26.83
Ethanol ext	400mg/kg	$18.2 \pm 0.69^{**}$	44.51

Values are expressed as Mean $\pm$ SEM, n=6, Data analyzed by one way ANOVA followed by Dunnet's test $^{**}P < 0.01$, $^{*}P < 0.05$.

Table 2: Analgesic Effect of Various Extracts of Roots of *Symphytum officinale* Using Tail Immersion Method

Treatment		Dose (mg/kg)		Reaction Time in Seconds (Mean±SEM)	
		0hr	1hr	2hr	3hr
Negative control (Normal saline)	5ml/kg	4.47 ± 0.13	5.14 ± 0.17	4.23 ± 0.15	4.49 ± 0.19
Positive control (Diclofenac sodium)	5mg/kg	4.28 ± 0.10	11.34 ± 0.34**	8.23 ± 0.24**	9.33 ± 0.14**
Petroleum ether ext	400mg/kg	4.81 ± 0.14	5.93 ± 0.24	5.10 ± 0.11	6.24 ± 0.17
Chloroform ext	400mg/kg	4.15±0.14	5.98±0.24	7.15±0.17*	7.01±0.12*
Ethanol ext	400mg/kg	4.12±0.17	7.13±0.18*	7.11±0.23*	8.13±0.17**

Values are expressed as Mean±SEM, n=6, data analyzed by one way ANOVA followed by Dunnette's test**P<0.01,*P<0.05.

RESULTS AND DISCUSSIONS

Acetic acid writhing test and tail immersion method performed for the analgesic studies showed 66% reduction of writhing and significant analgesic activity with ethanol extract when compared with standard drug.

CONCLUSIONS

In conclusion, the present study demonstrate that the *Symphytum officinale* roots has significant analgesic activity. The one, two or more constituents of *Symphytum officinale* are responsible for the activity which needs to be investigated further.

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